



App. No. 09/940,743
Amended, dated July 28, 2004
Reply to Office Action of April 30, 2004

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Amendments to the Claims:

The listing of claims will replace all prior versions, and listings, of claims in this application:

Listing of Claims:

1 Claim 1 (Currently amended): Electronic parts
2 mounting method, comprising the steps of:
3 moving a suction section, including a plurality of
4 suction nozzles, to a parts supply section in which a
5 plurality of the electronic parts are stored so that the
6 electronic parts ~~they~~ can be sucked at the same time,
7 sucking the electronic parts stored in the parts
8 supply section onto the plurality of suction nozzles at the
9 same time; and
10 mounting the sucked electronic parts on a board,
11 wherein the plurality of suction nozzles are
12 classified into groups according to a shift amount of the
13 plurality suction nozzles, a first group including first
14 suction nozzles having a shift amount within an allowable
15 range for simultaneous suction, and a second group
16 including second suction nozzles having a shift amount
17 outside the allowable range for simultaneous suction,
18 and then the electronic parts are sucked at the same
19 time by the first and second groups,

20 wherein the shift amount is between the center of each
21 of the plurality of suction nozzles and the center of an
22 electronic part,
23 the shift amount is found by a parts recognition unit
24 for recognizing a suction state of the electronic part onto
25 one of the plurality of suction nozzles, and
26 the first and second groups of the suction nozzles and
27 a position correction value of the suction section at each
28 group are changed according to the shift amount.

1 Claim 2 (Previously presented): The electronic parts
2 mounting method according to claim 1:

3 wherein the shift amount is defined between the
4 electronic parts sucked by the first suction nozzles and
5 the second suction nozzles.

1 Claim 3 (Currently amended): Electronic parts mounting
2 method, comprising the steps of:

3 moving a suction section, including a plurality of
4 suction nozzles, to a parts supply section in which a
5 plurality of the electronic parts are stored so that the
6 electronic parts ~~they~~ can be sucked at the same time,

7 sucking the electronic parts stored in the parts
8 supply section onto the plurality of suction nozzles at the
9 same time;

10 mounting the sucked electronic parts on a board,
11 wherein the plurality of suction nozzles are
12 classified into groups according to a shift amount of the
13 plurality of suction nozzles, a first group including first
14 suction nozzles having a shift amount within an allowable
15 range for simultaneous suction, and a second group
16 including second suction nozzles having a shift amount
17 outside the allowable range for simultaneous suction,
18 and then the electronic parts are sucked at the same
19 time by the first and second groups;
20 wherein the shift amount is defined between the
21 electronic parts sucked by the first suction nozzles and
22 the second suction nozzles; and
23 calculating a position correction value of each
24 suction section according to the shift amount of the first
25 and second groups,
26 wherein the electronic parts are sucked at the same
27 time by the first and second groups after correcting a
28 position of each suction section by using the position
29 correction value.

1 Claim 4 (Currently amended): The electronic parts
2 mounting method according to claim 3,

3 wherein the position correction value of each the
4 suction section is an average of a the maximum and a the
5 minimum of the shift amount,

6 wherein the shift amount is defined between a center
7 of each of the plurality of suction nozzles and a center
8 position of an electronic part at a parts suction position.

1 Claim 5 (Currently amended): Electronic parts
2 mounting method, comprising the steps of:

3 moving a suction section, including a plurality of
4 suction nozzles, to a parts supply section in which a
5 plurality of the electronic parts are stored so that the
6 electronic parts ~~they~~ can be sucked at the same time,

7 sucking the electronic parts stored in the parts
8 supply section onto the plurality of suction nozzles at the
9 same time;

10 mounting the sucked electronic parts on a board,

11 wherein the plurality of suction nozzles are
12 classified into groups according to a shift amount of the
13 plurality of suction nozzles in each group, a first group
14 including first suction nozzles having a shift amount
15 within an allowable range for simultaneous suction, and a
16 second group including second suction nozzles having a
17 shift amount outside the allowable range for simultaneous
18 suction,

19 and then the electronic parts are sucked at the same
20 time by the first and second groups;
21 wherein the shift amount is defined between the
22 electronic parts sucked by the first suction nozzles and
23 the second suction nozzles;
24 detecting each position of the plurality of the
25 suction nozzles; and
26 calculating a shift amount according to the each
27 position detected,
28 wherein the shift amount is defined between a center
29 position of the plurality of suction nozzles and a center
30 position of the electronic parts at the point where the
31 electronic parts are sucked.

1 Claim 6 (Previously presented): The electronic parts
2 mounting method according to claim 5,
3 wherein the center position of the plurality of
4 suction nozzles is detected after recognizing a tip face of
5 each of the plurality of suction nozzles.

1 Claim 7 (Previously presented): The electronic
2 parts mounting method according to claim 6,
3 wherein the center position of the plurality of
4 suction nozzles is detected after placing an inspection jig
5 on each of the plurality of suction nozzles.

1 Claim 8 (Previously presented): The electronic parts
2 mounting method according to claim 3,
3 wherein the shift amount is between the center of each
4 of the plurality of suction nozzles and the center of an
5 electronic part,
6 the shift amount is found by a parts recognition unit
7 for recognizing the suction state of the electronic part
8 onto one of the plurality of suction nozzles, and
9 the first and second groups of the suction nozzles and
10 the position correction value of the suction section at
11 each group are changed according to the shift amount,
12 wherein the electronic parts are sucked simultaneously
13 at each of the first and second groups.

1 Claim 9 (Currently amended): The electronic parts
2 mounting method according to claim 1,
3 wherein the plurality of suction nozzles are
4 classified into one of the first group and the second group
5 in order to suck the parts,
6 wherein, at said each group classified, errors for
7 suction have occurred exceeding a predetermined number of
8 times or a ~~the~~ parts suction ratio is less than a
9 predetermined value.

1 Claim 10 (Previously presented): The electronic parts
2 mounting method according to claim 1 further comprising:
3 selecting a mode of allowable range for simultaneous
4 suction from several modes; and
5 setting the selected mode in order to classify the
6 plurality of suction nozzles into several groups according
7 to the modes,
8 wherein the modes are divided into several ranks
9 between a mode for giving high priority to productivity and
10 a mode for giving high priority to parts suction ratio.

1 Claim 11 (Previously presented): The electronic parts
2 mounting method according to claim 2,
3 wherein the shift amount between the center of —an
4 electronic part at a parts suction position and the center
5 of each of the plurality of suction nozzles,
6 and the shift amount is corrected by changing a feed
7 amount of the electronic parts from the parts supply
8 section.

Claims 12-16 (Cancelled)